DISC SAW BLADE

The invention relates to a disc saw blade of the type that is described in the preamble to the independent patent claim 1.

Hydraulic cutter blades or crosscut chain saws are currently used for various crosscutting purposes within the forestry industry, for example for units mounted in the crane end of harvesters, forwarders, excavators or suitable machines of other types. A great problem with crosscut chain saws is the difficulty of cutting several small trees simultaneously without breaking the saw bar and the chain. It is therefore desirable to use a disc saw blade instead, which works considerably faster than both the hydraulic cutter blade and the crosscut chain saw, as the trees are cut using the same working method as with a conventional clearing saw. By this means, it is possible, for example, to fell fuel wood in neglected clearing areas and to carry out roadside visibility clearance and clearing of power line paths, etc, in an efficient way. Conventional disc saw blades have as a rule, however, fixed or removable cutting edges of hard metal. A disadvantage of this type of disc saw blade is that it must be dismantled and sent to be repaired after it has hit a stone.

If, instead, a disc is used that has a standard saw chain tensioned around its circumference, a plurality of advantages are obtained in comparison to conventional disc saw blades. There has been strong competition between different manufacturers in the development of saw chains with the result that saw chains offer good value for money. A stone-damaged chain can be replaced by a newly-sharpened chain in just a few minutes. Electrical chain sharpeners, both manual and automatic, are already to be found at the premises of most forestry contractors and power saw workshops. It is therefore possible

to keep chains sharpened at a low cost, which, in addition to better functioning, also reduces the power requirement of the machine. A disc saw blade of this type is described in US-A-4627322. The disc saw blade described in this patent document is provided with a saw chain tensioned around a plate device. The plate device is designed with a first and a second plate and the chain is guided via its driving links in a chain groove that is delimited peripherally between the plates. The chain is held in the chain groove by frictional engagement between the driving links and the interconnected plates.

A disadvantage of this previously-known disc saw blade is that changing the chain is relatively time-consuming and can require access to special tools, as the plates in the plate device must be dismantled in order to release the chain. This work can be difficult to carry out in a workplace that is outdoors and exposed to wind and rain. In addition, in certain cases it can be necessary for the chain to be tensioned with a special chain tensioner that weakens the chain.

An object of the invention is therefore to achieve a disc saw blade that can be kept sharpened by simple conventional measures in a more cost-effective way than was previously the case. This is possible with a disc saw blade according to the characterizing part of the independent patent claim 1. Advantageous further developments and improvements to the invention are apparent from the description and the dependent patent claims.

A disc saw blade according to the invention is described in greater detail in the following description, with reference to the attached schematic drawings. Figure 1 is a plan view that shows a sector of the disc saw blade with mounted chain, Figure 2 is an enlarged view cut through to the centre of the disc groove that shows a straightened-out section A-A of the disc saw blade with the chain

in a neutral position, and Figure 3 shows a view similar to Figure 2, but with the chain in a working position, Figure 4 is an additional enlarged view of components in Figure 3, Figure 5 shows a cross-section through the chain groove in the circumference part of the circular disk along the line B-B in Figure 3, Figure 6 shows a cross-section through the chain groove in the circumference part of the circular disk along the line C-C in Figure 2 and Figure 7 shows a cross-section through the chain groove with driving links in the circumference part of the circular disk along the line D-D in Figure 2.

The drawings show a disc saw blade 2 with a circular disk 4 around a centre point 3, with a conventional saw chain12 mounted around the circumference 5 of the circular disk, which saw chain has driving links 6, connecting links 8 and cutting links 10. A peripheral chain groove 14 is machined in the circumference 5 of the disk 4 for this purpose. Each connecting link 8 has an elongated edge 16 which faces towards the circumference 5.

Alternatively, two or more parallel grooves (not shown) can be machined, depending upon whether one or more saw chains are to be used. Where applicable, the disk 4 is designed with a correspondingly greater thickness. As, when two or more saw chains are used, each groove is designed in a similar way to when a single saw chain is used, for the sake of clarity the disc saw blade 2 shown in this embodiment is of the latter type.

The groove 14, or where applicable the grooves, are each first machined to only approximately half the depth X from the circumference 5 that is required for the driving links 6. Level with the centre of each driving link 6 there is, in addition, a recess 18 with a curved outer surface that is milled out to a depth that corresponds to the other half of the depth X that is required for the driving

links. From the centre point 3 of the disk, the radius is the length r_o to the circumference 5, r_{sb} to the respective recess that constitutes the bottom 18 of the groove, and r_u to the radial projection 20, formed between the recesses. $X = r_o - r_{sb}$. This depth X that is required for the driving links is marginally larger than a distance $S_{id} = r_o - r_{id}$, that each driving link 6 extends radially inwards, by means of a part 22 that projects radially inwards, from the respective edge 16 of the connecting links 8, when the edge 16 is in contact with the circumference 5 of the disk 4.

In radial cross-section, each projection 20 is preferably designed as a truncated cone, with a complimentary shape to the cam surface 24 on the part 22 of the interacting driving link 6 that projects radially inwards. Within the framework of the invention, however, each projection can also have other shapes. Thus, in radial cross-section, each projection can be the shape of a lug, a pyramid, a dome, etc, and can, in its simplest form, be constructed by a welding bead 20 arranged at the bottom 18 of the groove 14.

In other words, the groove 14 has a bottom 18 that is provided with radial projections 20 that are evenly distributed around the circumference. The part 22 of the driving link 6 that projects radially inwards has a rounded back edge, facing in the opposite direction to the cutting direction of the saw chain 12, which constitutes a cam surface 24 that can slide over the associated projection 20. When it slides over the projection 20, the cam surface 24 is pressed radially outwards by the projection until the saw chain 12 is tensioned and is held onto the disk 4 as a result of its shape.

The saw chain 12 can be mounted on the circular disk 4 with the driving links 6 projecting radially inwards into the groove 14. By moving the saw chain 12

in the groove 14 along the circumference of the disk 4 until each driving link 6 comes in the centre of a recess 18, the saw chain 12 can be joined together in a conventional way with two securing plates (not shown) and thus does not need to be tensioned very tightly. The length of the saw chain 12 and the circumference radius r_0 of the disk 4 are related in such a way that, when the saw chain is mounted, the radius r_{id} to the part 22 of each driving link of the chain that projects radially inwards is greater than the radius r_{sb} to the bottom of the groove and smaller than the radius r_u to each projection.
By this means, when the disc saw blade 2 is caused to rotate and the cutting links 10 are cutting, the driving links 6 of the saw chain 12, which in the standard version have a rounded back edge, are pressed into contact with the corresponding projections 20 of the disk 4. Each of the rounded back edges or cam surfaces 24 is then pressed radially outwards by the respective projection 20, whereby the saw chain 12 is tensioned and rotates with the disk 4. In other words, this design has a function with automatic chain tensioning, that tensions the chain optimally.

Even though the disc saw blade has optimal rotation characteristics and runs most smoothly when the bottom of the groove has one projection for each driving link, it is also possible, for use with relatively soft material or material with a relatively small diameter, to arrange a smaller number of projections distributed evenly around the circumference of the disk.